

CLAIMS

1. An active matrix display device comprising an array of display pixels, each pixel comprising:

5 a current-driven light emitting display element (2) comprising an area of light emitting material (76) sandwiched between electrodes; and

a drive transistor circuit for driving a current through the display element, the drive transistor circuit comprising a thin film circuit formed on a substrate, the thin film circuit defining a drive transistor (22) and a light-sensitive device (27; 84)
10 for detecting the brightness of the display element, the light-sensitive device having an input surface,

wherein the drive transistor (22) is controlled in response to the light-sensitive device output and

wherein each pixel further comprises a light blocking structure (100) formed
15 from the thin film layers in the proximity of the light-sensitive device (84) and substantially at the level of the input surface for preventing the passage of light to the light-sensitive device from a substantially lateral direction.

2. A device as claimed in claim 1, wherein the light blocking structure (100)
20 comprises a ring surrounding the light-sensitive device.

3. A device as claimed in claim 1 or 2, wherein the light blocking structure is formed from one or more of the thin film layers defining the light-sensitive device (84).
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4. A device as claimed in any preceding claim, wherein the light blocking structure is substantially planar.

5. A device as claimed in any one of claims 1 to 3, wherein the light blocking
30 structure comprises a side wall (110) extending downwardly from the level of the input surface.

6. A device as claimed in any preceding claim, wherein the light blocking structure comprises first (100) and second (120) light blocking elements, the first light blocking element (100) being provided at the level of the input surface, and the second light blocking element (120) being provided above the level of the input surface.

7. A device as claimed in claim 6, wherein the first light blocking element (100) is formed from one or more of the thin film layers defining the light-sensitive device, and the second light blocking element is formed from a metal layer (70) which defines the source and drain of the drive transistor (22).

8. A device as claimed in any preceding claim, wherein the light-sensitive device (84) is formed beneath the light emitting display element.

9. A device as claimed in claim 8, wherein the electrodes comprise a top reflective electrode (80) and a bottom substantially transparent electrode (74).

10. A device as claimed in claim 8, wherein the electrodes comprise a top substantially transparent electrode (80a) and a bottom electrode (74a) which is at least partially reflective.

11. A device as claimed in claim 10, wherein the bottom electrode (74a) is substantially fully reflective and comprises an aperture (150) to allow the passage of light through the bottom electrode to the light-sensitive device (84).

12. A device as claimed in claim 10, wherein the bottom electrode is semitransparent to allow the passage of light through the bottom electrode to the light-sensitive device.

13. A device as claimed in claim 1, wherein the light blocking structure comprises a refractive index cavity (130) formed on top of the input surface of the light-sensitive device.

14. A device as claimed in claim 13, wherein the refractive index cavity (130) comprises an air cavity.

15. A device as claimed in claim 14, wherein the light blocking structure further
5 comprises an air cavity layer (130) formed beneath a bottom surface of the light-sensitive device.

16. A device as claimed in any preceding claim, wherein the substrate comprises a glass substrate.

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17. A device as claimed in any one of claims 10 to 12, wherein the substrate comprises a metal foil and insulating dielectric layer.

18. A device as claimed in any one of claims 10 to 12 or 17, wherein a side of
15 the substrate opposite the thin film circuitry is arranged to disturb reflection of light at the lower surface of the substrate.

19. A device as claimed in claim 18, wherein the side of the substrate opposite the thin film circuitry is arranged to absorb light.

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20. A device as claimed in claim 18 or 19 wherein the side of the substrate opposite the thin film circuitry is arranged to scatter light.

21. An active matrix display device comprising an array of display pixels, each
25 pixel comprising:

a current-driven light emitting display element (2) comprising an area of light emitting material (76) sandwiched between electrodes; and

a drive transistor circuit for driving a current through the display element comprising a drive transistor (22) and a light-sensitive device (27) for detecting the
30 brightness of the display element, wherein the drive transistor is controlled in response to the light-sensitive device output,

wherein the electrodes comprise a top substantially transparent electrode (80a) and a bottom electrode (74a) which is at least partially reflective, and

wherein a side (170) of the substrate opposite the thin film circuitry is arranged to disturb reflection of light at the lower surface of the substrate.

22. A device as claimed in claim 21, wherein the side (170) of the substrate
5 opposite the thin film circuitry is arranged to absorb light.

23. A device as claimed in claim 22, wherein the side (170) of the substrate opposite the thin film circuitry is matt black.

10 24. A device as claimed in claim 21, 22 or 23, wherein the side (170) of the substrate opposite the thin film circuitry is arranged to scatter light.

25. A device as claimed in any preceding claim, wherein the light-dependent (27) device comprises a photodiode.

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26. A device as claimed in claim 25, wherein the photodiode (27) comprises a PIN or NIP diode stack or a Schottky diode and top and bottom contact terminals.

20 27. A device as claimed in any preceding claim, further comprising a light shield (90) layer at the base of the light-sensitive device.

28. A device as claimed in claim 27, wherein the light shield layer (90) has a footprint larger than the footprint of the light sensitive device (27;84).